

PVT Measurements of Mixtures of n-Undecane and n-Dodecane on the Saturation Line

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A review on PVT properties of alkanes over wide a range of temperatures is given in [1]. From this work, it is clear that there are no data on PVT-properties of mixtures of undecane with dodecane in the literature. This work is devoted to an experimental research of the temperature dependence of the vapor pressure for compositions of 40 and 50 % of undecane (60 and 50 % dodecane) on the saturation line. Researches were carried out on an experimental installation with a high-pressure optical cell intended for measurement of phase transitions in simple and multicomponent liquid-gas and liquid-liquid systems in wide intervals of temperatures and pressure [2,3]. Mixtures were prepared from undecane and dodecane of grade "P". Both the alkanes mix thoroughly. The volume of the cell is 10 cm³. Measurements were made at constant volume. Researches were carried out in intervals of temperatures and pressure 303-659 K and 0.1-1.94 MPa. The error of measurement does not exceed $\pm 1,5$ %. Vapor pressure was measured by piston manometer MP-600 to a precision 0.05 %. The working substance of the manometer is castor oil. As a separator between the liquid in cell and the castor oil in the manometer, liquid gallium is used. The temperature in the optical cell was measured by a platinum resistance thermometer with an uncertainty not worse than ± 0.01 K. Results are presented in tables and diagrams. To approximate the temperature dependence of the saturated vapor pressure of the studied mixture, an empirical equation was selected: $P = a + bT + cT^2 + dT^3$, where P is saturated vapor pressure in Pa, T is temperature in Kelvin, and a , b , c and d are coefficients fitted by least squares method.

References

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